Climate Adaptation & California Native American Tribes

CALIFORNIA natural resources AGENCY

GOVERNOR'S OFFICE OF PLANNING AND RESEARCH · STATE OF CALIFORNIA ·

Agenda

State climate policy and addressing tribal climate change vulnerabilities:

1. *Safeguarding California*
2. Discussion of Tribal climate change vulnerabilities
3. *Sea Level Rise Guidance Document* and discussion

Supporting tribal and regional climate adaptation efforts and California climate change research:

1. *Integrated Climate Adaptation and Resiliency Program*
2. *California's Fourth Climate Change Assessment*
3. Discussion of ongoing tribal climate change adaptation and state support

California Climate Adaptation Policy

Policy Guidance

Safeguarding California

Sea Level Rise Guidance Document

Research

4th Climate Change Assessment

Tools for Local Action

Integrated Climate Adaptation and Resiliency Program

Climate Change Policy

Adaptation

Adjustment in natural or human systems to a new or changing environment. Adaptation to climate change refers to adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

Mitigation

A human intervention to reduce the human impact on the climate system; it includes strategies to reduce greenhouse gas sources and emissions and enhancing greenhouse gas sinks.

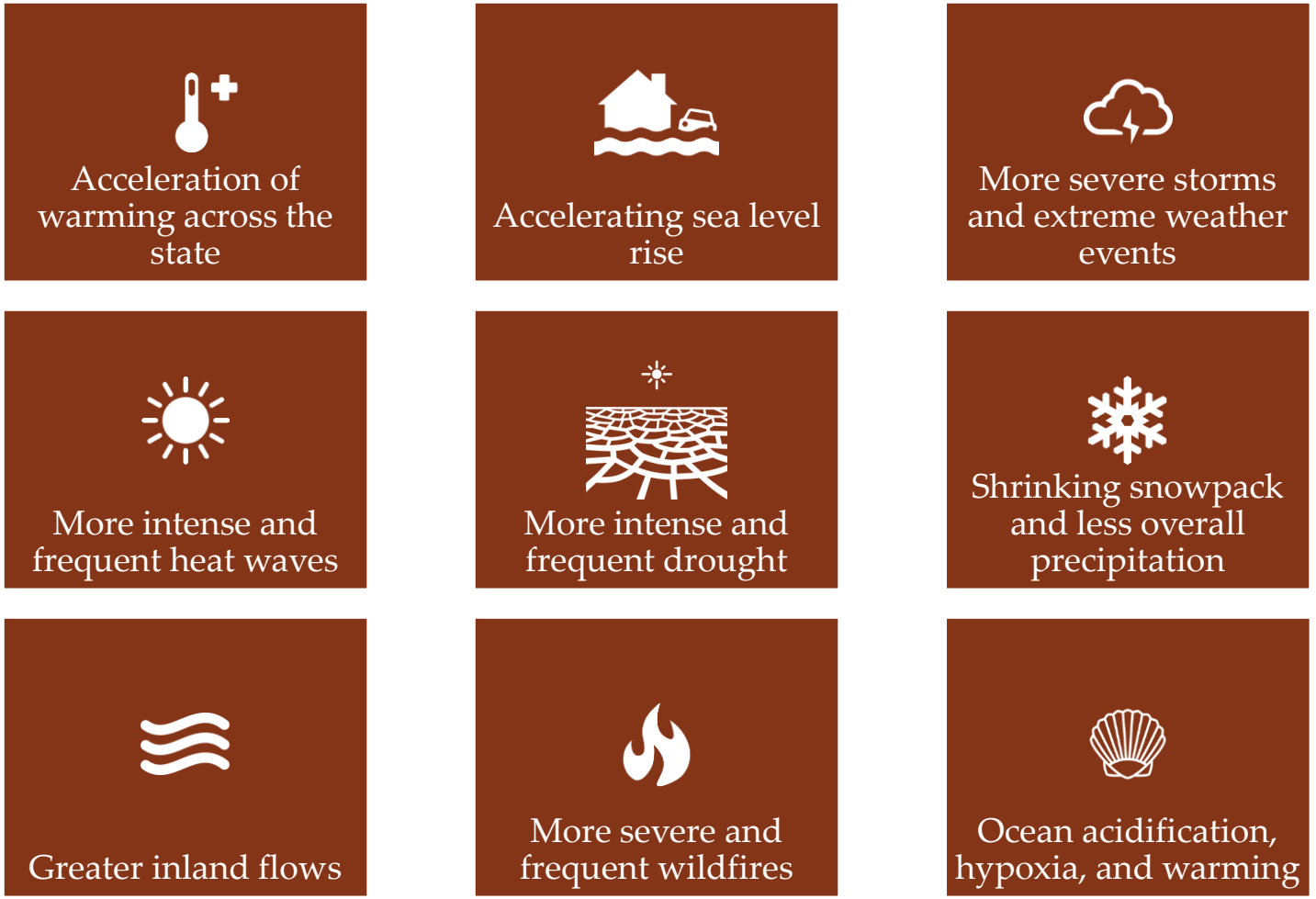
Source: Glossary of Climate Change Terms, US EPA Office of Air and Radiation/Office of Atmospheric Programs/Climate Change Division

Ongoing Impacts of Climate Change in California

PAST 3 YEARS	Have been the hottest ever
5 OF 10	Of the warmest years on record have occurred since 2003
4.6ºF	Increase in average temperatures since 1975
7-8 INCHES	Rise in sea level already observed
50%	Below average snowpack in the Sierras in 3 of the past 4 years
80%	Increased in area burned from 2010-2015 over the prior decade due to increasing wildfire severity

Source: California EPA Office of Environmental Health Hazard Assessment

California's Climate Future



Source: California's Third Climate Change Assessment

Tribal Climate Change Vulnerabilities + Impacts

"Key vulnerabilities include the **loss of traditional knowledge** in the face of rapidly changing ecological conditions, **increased food insecurity** due to reduced availability of traditional foods, **changing water availability**, Arctic sea ice loss, permafrost thaw, and relocation from historic homelands."

Source: 2014 National Climate Assessment

Safeguarding California

California's Climate Adaptation Strategy

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What is *Safeguarding California?*

DRAFT REPORT

Safeguarding California Plan:

2017 Update

California's Climate Adaptation Strategy





CALIFORNIA natural resources AGENCY

May 2017

Goal: to move California towards a state of preparedness in which:

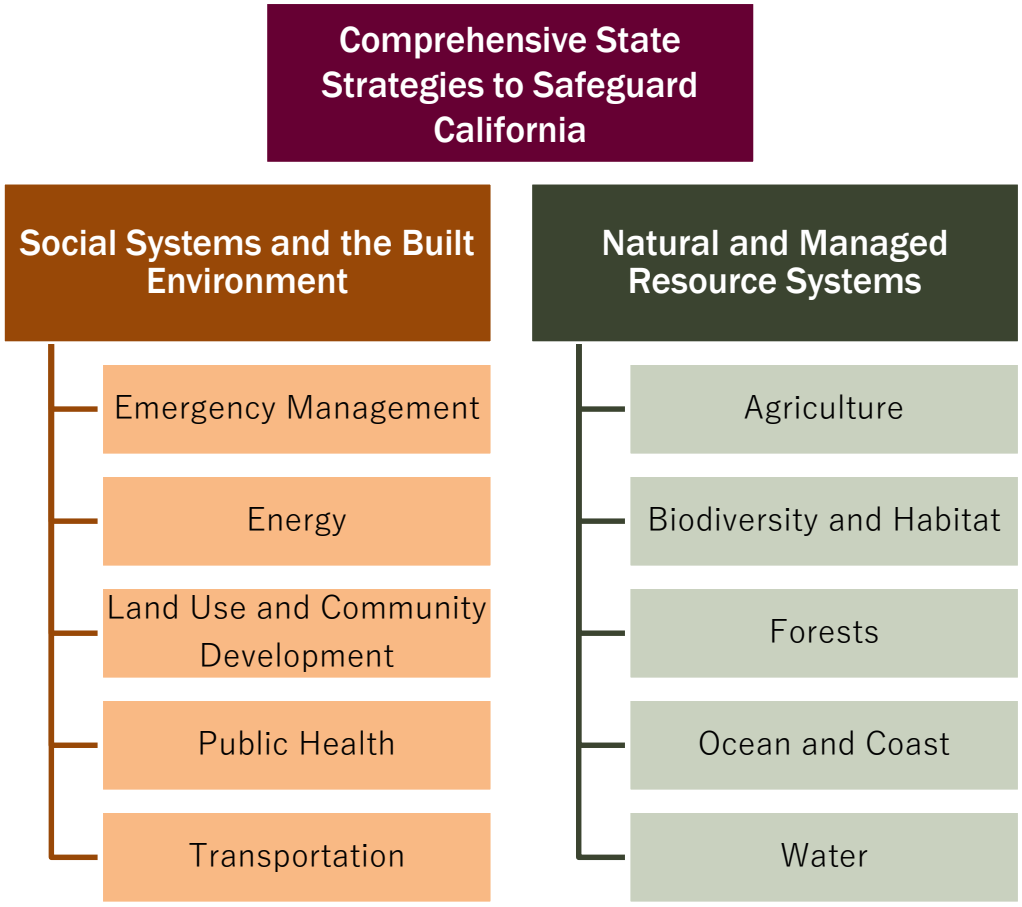
People + communities respond to changing conditions, shocks, and stresses in a manner that minimizes risks to public health and safety while maximizing equity and protection of the most vulnerable so that they can thrive despite climate change

Built infrastructure systems continue to provide critical services

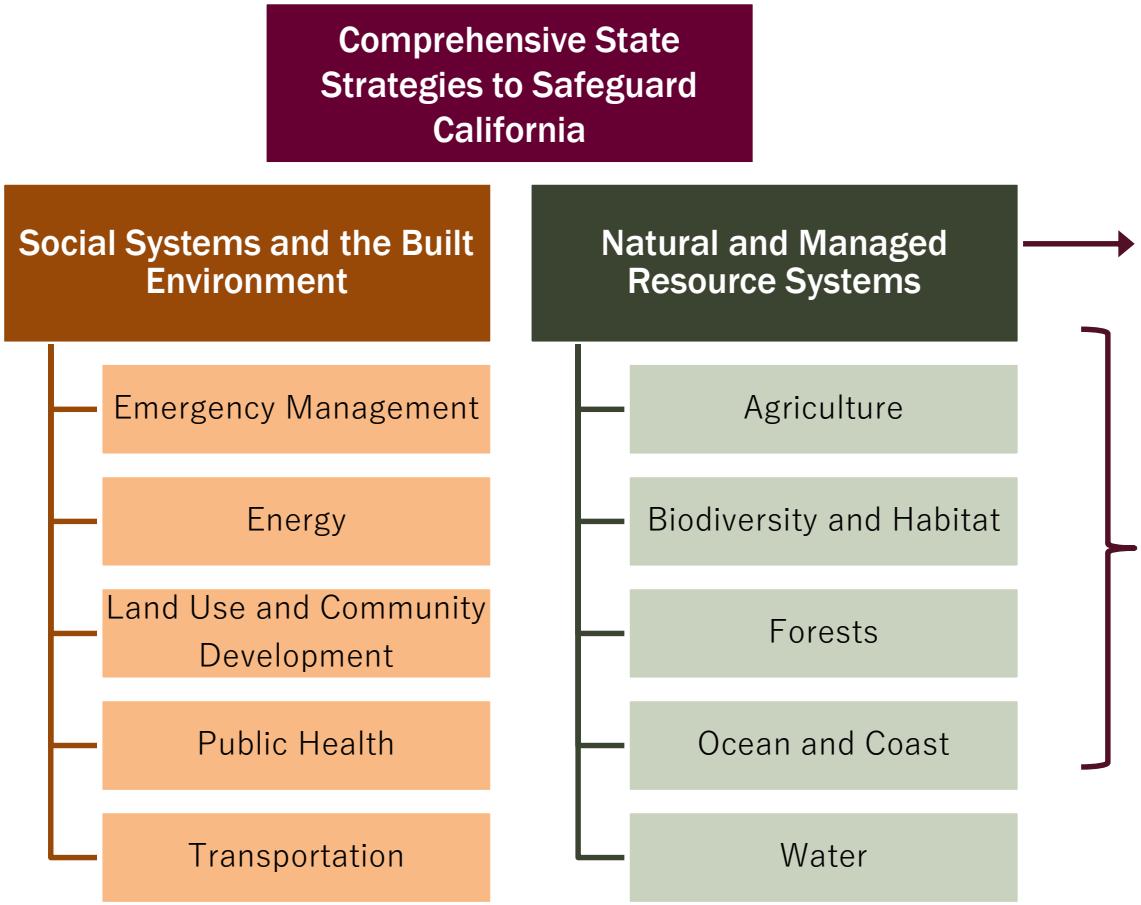
Natural systems adjust and function in the midst of climate change

Government managers at all levels take climate change adaptation into account in all aspects of their work

Organization



Organization



2 Broad policy umbrellas

5 Chapters per umbrella, each with:

- High level recommendations
- Ongoing actions
- Next steps

Organization

Emergency Management	Agriculture
Energy	Biodiversity & Habitat
Land Use & Community Development	Forests
Public Health	Ocean & Coast
Transportation	Water

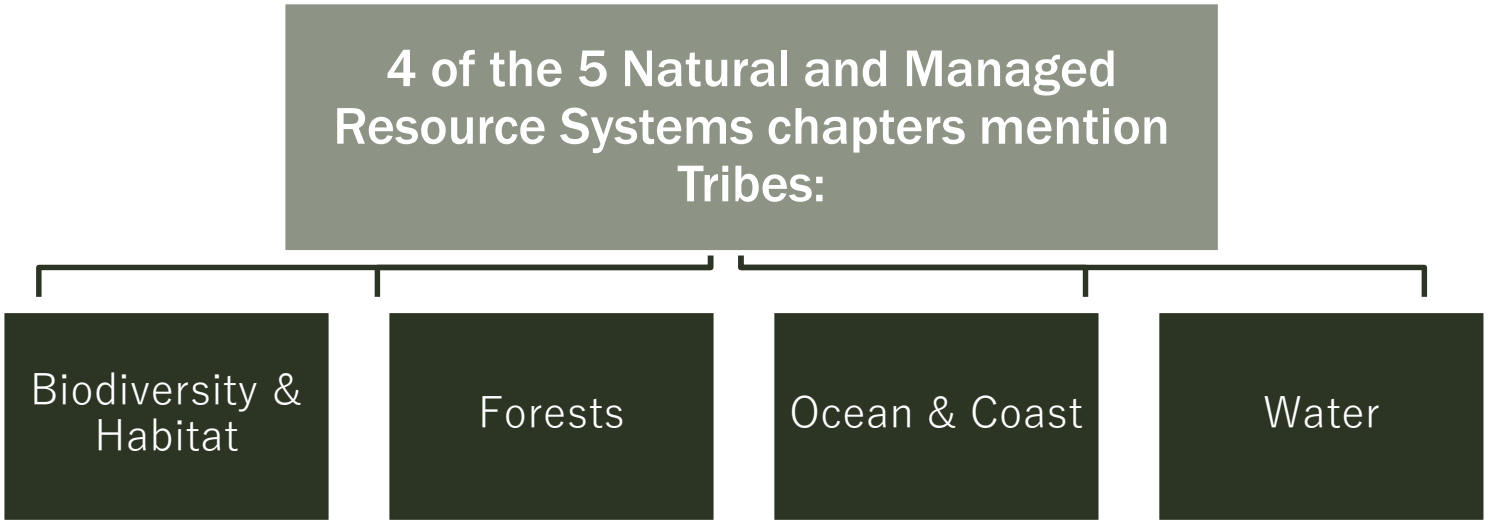
Each of these 10 chapters outlines:

High level recommendations:
5-10 goals to guide the chapter

Next steps:
Objectives and strategies needed to achieve each recommendation

Ongoing actions:
Summary of climate adaptation and programs already happening related to that recommendation

Recommendations Involving Tribes



Biodiversity and Habitat

Recommendation B-1: Strengthen the climate adaptation component of conservation planning efforts at multiple scales.

B-1.3 Engage and support local and tribal communities in their planning processes where significant ecological resources are concerned.

Forests

Recommendation F-1: Enhance forest health and resilience by improving forest management on private and public lands.

F-1.4. Partner with Native American tribes to benefit from traditional knowledge of prescribed fire and forest management.

Forests

R**ecommendation F-4:** Promote rural and tribal economic development by expanding wood products markets, biomass utilization, and outdoor recreation.

F-4.2 Provide financial and technical assistance to rural communities and Native American Tribes near forested areas to increase capacity for biomass utilization.

F-4.6. Work with Native American tribes to protect tribal access to non-timber forest products and traditional activities such as cultural burns and activities related to subsistence in forests such as hunting, fishing, and trapping.

Forests

Recommendation F-6: Foster fire-adapted communities through local planning and fire preparedness.

F-6.7. Create land-use and community-based wildlife protection plans and decision support tools that are informed by climate projections and an ongoing understanding of wildfire risk.

F-6.7c. Develop county and regional fire readiness plans with community-based groups such as fire safe councils, fire and land management agencies; engage individual community and tribal members in these efforts.

Ocean and Coast

Recommendation O-1: Leverage regulatory, permitting, and planning authority to preserve coastal communities and resources by adapting infrastructure and other development to be more resilient to sea level rise and extreme events.

O-1.5. Develop policies to protect public trust, cultural, and archaeological resources along the coast.

O1.5a. Identify existing or potential threats to public trust assets and develop policies that ensure the ongoing availability of trust lands and their values for current and future generations.

O1.5b. Assess and plan for the protection of beaches and public access to the shoreline so that the loss of beaches does not disproportionately burden underserved or other underrepresented populations.

O1.5c Safeguard cultural and archeological resources threatened by sea level rise and ensure California Native American tribes and other affected groups are involved and supported in planning efforts to address these impacts.

Ocean and Coast

Recommendation O-4: Assess community and ecosystem vulnerability through the use of decision-support tools and analyses.

O-4.2. Assess the vulnerability of archaeological sites and natural and cultural resources to sea level rise.

O-4.2a. Work with tribes on participatory mapping of coastal tribal resources and development of vulnerability assessments.

O-4.2b. Initiate vulnerability study of the Department of Parks and Recreation's natural and cultural resources' exposure to sea-level rise.

Water

Recommendation W-6: Address water-related impacts of climate change on vulnerable and disadvantaged populations and cultural resources.

W-6.7. The Water Board will increase outreach to environmental justice and disadvantaged communities and Native American tribes in collaboration with non-governmental organizations.

Discussion

Based on the climate change vulnerabilities you have observed or experienced:

1. How could the current recommendations be improved?
2. What should be added into the chapters that do not mention tribes?
3. Are there any projects to list as “ongoing actions?”

Sea Level Rise Guidance

A guidance document for incorporating sea-level rise projections into planning, permitting, investment, and other decisions for state, regional, tribal, and local users

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Updating California's Sea-level Rise Guidance

CALIFORNIA
OCEAN PROTECTION COUNCIL

State Sea-level Rise Guidance Document

- Incorporating sea-level rise projections into state and local decision-making.
- Updating guidance to reflect recent advances in ice loss science and projections of sea-level rise.
- Opportunities for engagement with state agencies, local governments, consultants, non-governmental organizations, **tribes**, vulnerable communities, and other constituents.

Process & Opportunities for Engagement

December 2016 - April 2017: State agency, local government and constituent engagement: interviews and five listening sessions; CO-CAT meetings

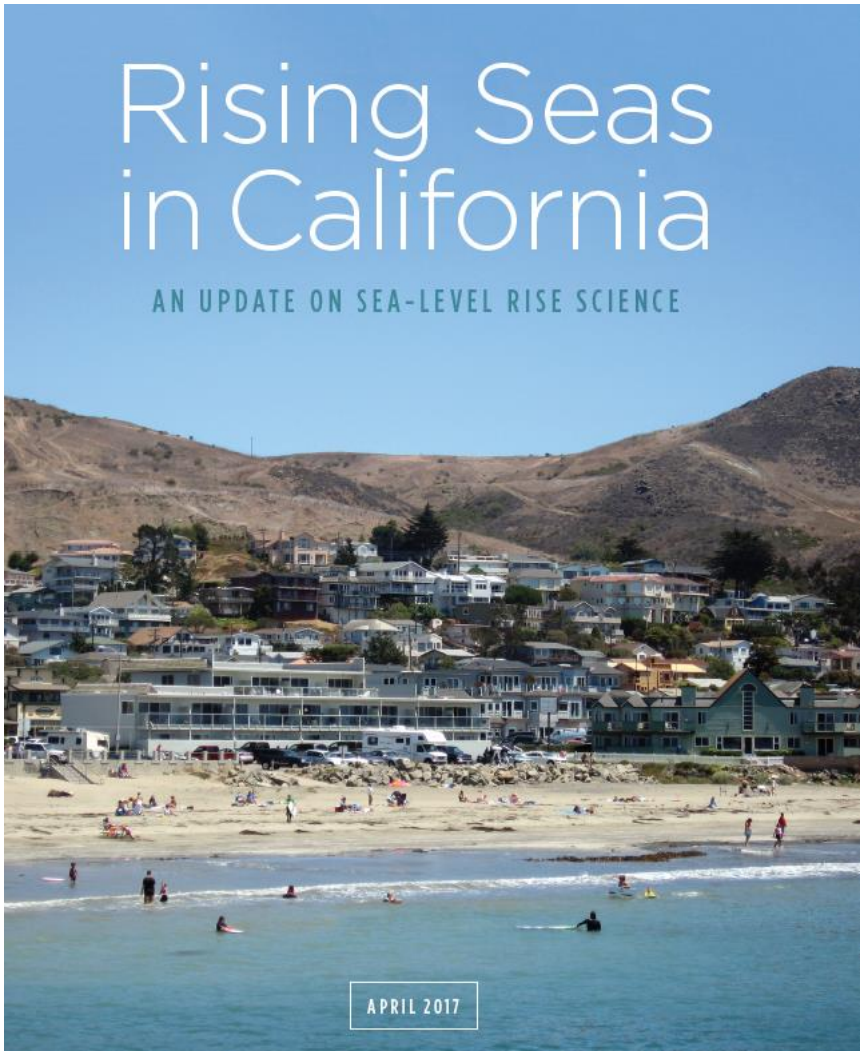
April 26 2017: OPC Meeting: Science summary presented to the OPC; OPC Resolution adopted

May - June 2017: Series of public workshops to solicit feedback on a draft framework for the *State Sea-level Rise Guidance Document*

October - November 2017: 30-day public comment period on a draft update to the *State Sea-level Rise Guidance Document*

January 2018: OPC Meeting: Potential approval by the OPC of the updated *State Sea-level Rise Guidance Document*

Recently released science report



OPC-SAT Working Group

Gary Griggs, *University of California Santa Cruz*

Dan Cayan, *Scripps Institution of Oceanography*

Claudia Tebaldi, *National Center for Atmospheric Research & Climate Central*

Helen Amanda Fricker, *Scripps Institution of Oceanography*

Joseph Arvai, *University of Michigan*

Robert DeConto, *University of Massachusetts*

Robert E. Kopp, *Rutgers University*

Global mean sea-level rise

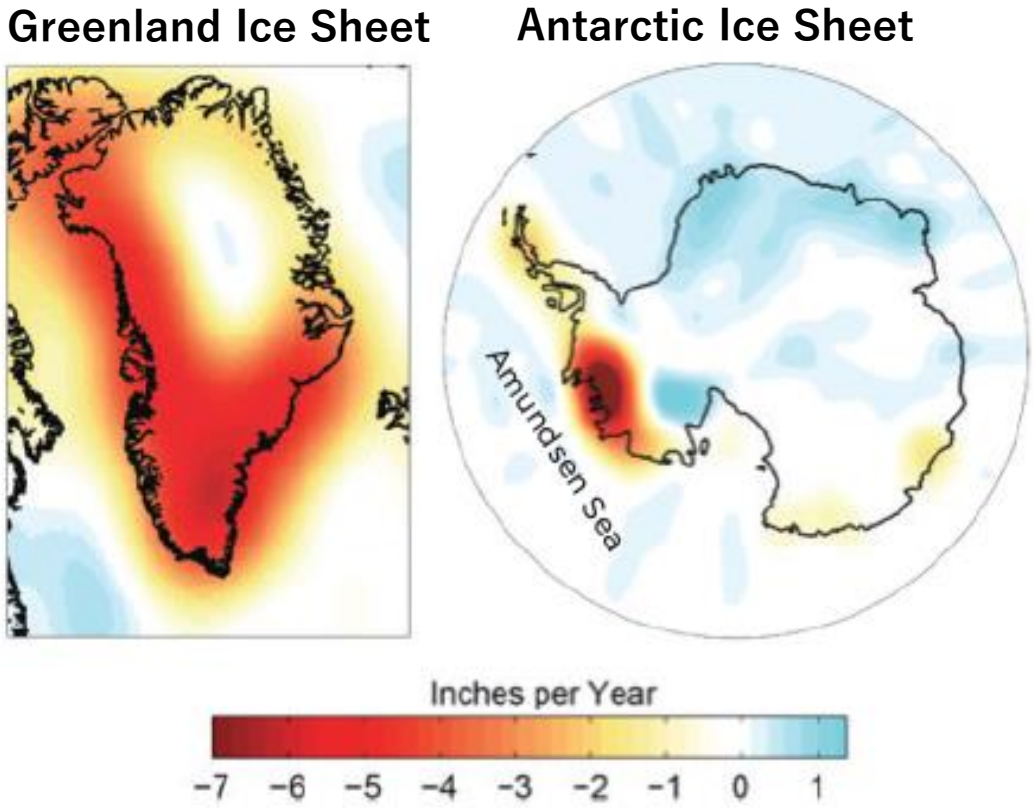
Sea levels are rising and the rate is accelerating

Satellite altimetry reveals a rate of 1.3 inches/decade

Sea levels are rising from ocean thermal expansion, land ice melting and loss of ice from polar ice sheets

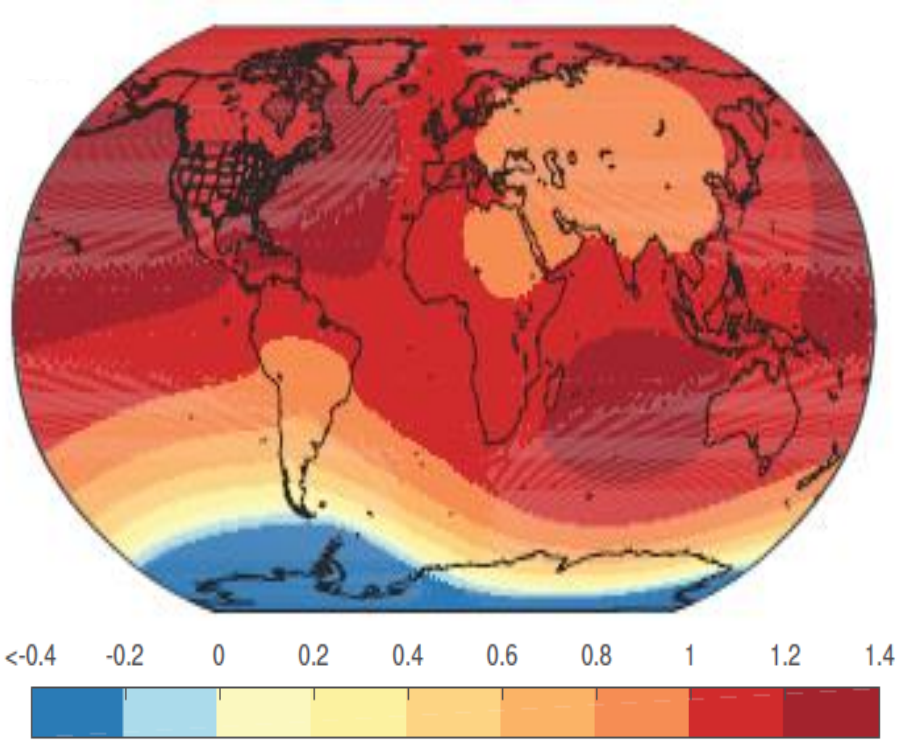
Recent observations of ice loss

Loss of ice from the Greenland and Antarctic ice sheets will soon become the dominant source of sea-level rise



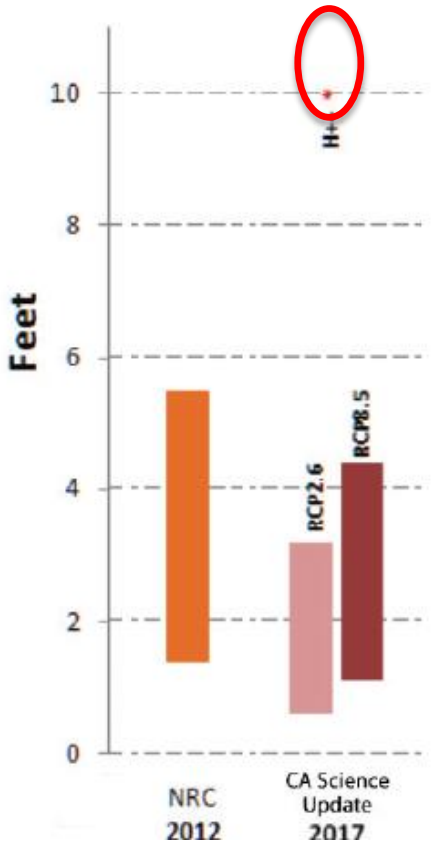
Ice mass loss (inches of water equivalent lost per year between 2003 and 2012) over Greenland and Antarctica from the GRACE satellite.

Sea-Level ‘Fingerprints’



For every foot of global sea-level rise caused by the loss of ice on West Antarctica, sea-level will rise about 1.25 feet along the California coast.

Updating California projections



- Adopting a probabilistic approach; shift from scenario-based approach due to advances in observation and modeling
- Comprehensive probability distributions for sea-level rise
- Projections conditional on emissions scenarios
- Localized projections
- Scientists included extreme sea-level rise scenario alongside the probability distributions

Sea-level Rise Projections: La Jolla

Feet above 1991-2009 mean	MEDIAN	LIKE LY RANGE	1- IN-20 CHANCE	1- IN-200 CHANCE
Year / Percentile	*50% probability SLR meets or exceeds…*	*67% probability SLRis between…*	*5% probability SLR meets or exceeds…*	*0.5% probability SLR meets or exceeds…*
2030	0.5	0.4 — 0.6	0.7	0.9
2050	0.9	0.7 — 1.2	1.4	2.0
2100 (RCP 2.6)	1.7	1.1 — 2.5	3.3	5.8
2100 (RCP 4.5)	2.0	1.3 — 2.8	3.6	6.0
2100 (RCP 8.5)	2.6	1.8 — 3.6	4.6	7.1
2100 (H++)	10			
2150 (RCP 2.6)	2.5	1.5 — 3.9	5.7	11.1
2150 (RCP 4.5)	3.1	1.9 — 4.8	6.5	11.8
2150 (RCP 8.5)	4.3	3.0 — 6.1	7.9	13.3
2150 (H++)	22			

‘Exceedance’ probabilities

(a) RCP 8.5

	1 FT.	2 FT.	3 FT.	4 FT.	5 FT.	6 FT.	7 FT.	8 FT.	9 FT.	10 FT.
2020										
2030	0.1%									
2040	5.5%									
2050	40%	0.5%								
2060	74%	4%	0.3%	0.1%						
2070	89%	17%	1.5%	0.3%	0.1%					
2080	95%	41%	6%	1.1%	0.3%	0.1%	0.1%			
2090	97%	62%	17%	4%	1.0%	0.4%	0.2%	0.1%	0.1%	
2100	98%	75%	33%	10%	3%	1%	0.5%	0.3%	0.2%	0.1%
2150	100%	97%	83%	58%	33%	17%	9%	5%	3%	2%
2200	100%	98%	93%	83%	70%	55%	40%	28%	20%	14%

Summary: Key Findings

1. Scientific understanding of sea-level rise is advancing at a rapid pace. Periodic updates of Sea-level Rise Guidance will be necessary.
2. The direction of sea level change is clear; sea-level is rising.
3. The rate of ice loss from the Greenland and Antarctic Ice Sheets is increasing.
4. New scientific evidence has highlighted the potential for extreme sea-level rise.
5. Probabilities of specific sea-level increases can inform decisions.
6. Current policy decisions are shaping our coastal future.
7. Waiting for scientific certainty is neither a safe nor prudent option.

Next Steps

- Complete public outreach in June 2017
- Draft policy guidance
- Release for public review in Fall 2017
- Final guidance approved by the Ocean Protection Council in January 2018

Questions for discussion:

- How is the current sea-level rise guidance being used?
- What information should be included in the updated guidance to help users incorporate sea-level rise in their decision-making?

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Integrated Climate Adaptation and Resiliency Program

Purpose

Coordinate state, tribal, local, and regional activities with a focus on local implementation

Cross-cutting objectives

Advance equity and environmental justice

Support an integrated approach to climate change (adaptation and mitigation)

Integrated Climate Adaptation and Resiliency Program

Adaptation Clearinghouse

Science and Research

Cal-Adapt

Policy guidance and decision support

Adaptation Planning Guide

Case Studies (CA based)

On-the-ground lessons learned

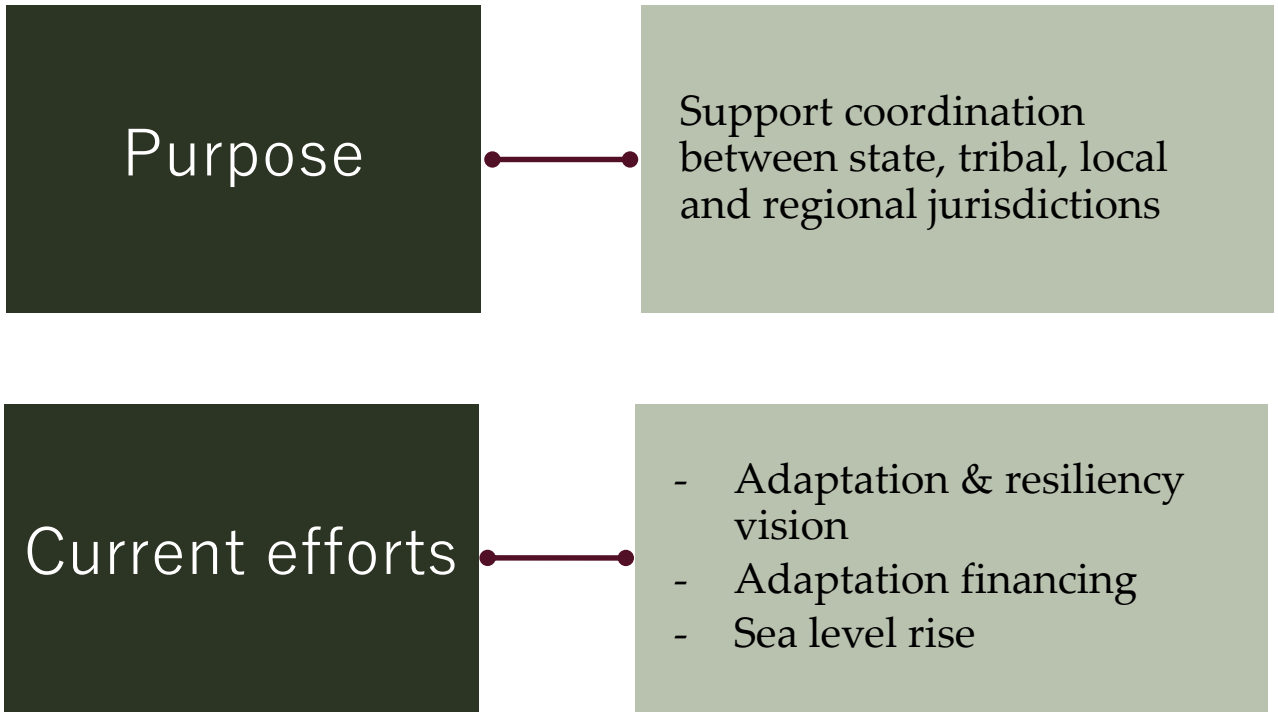
Funding

Funding Wizard

Clearinghouse website: *https://www.opr.ca.gov/s_climateadaptation.php*

Integrated Climate Adaptation and Resiliency Program

Technical Advisory Council



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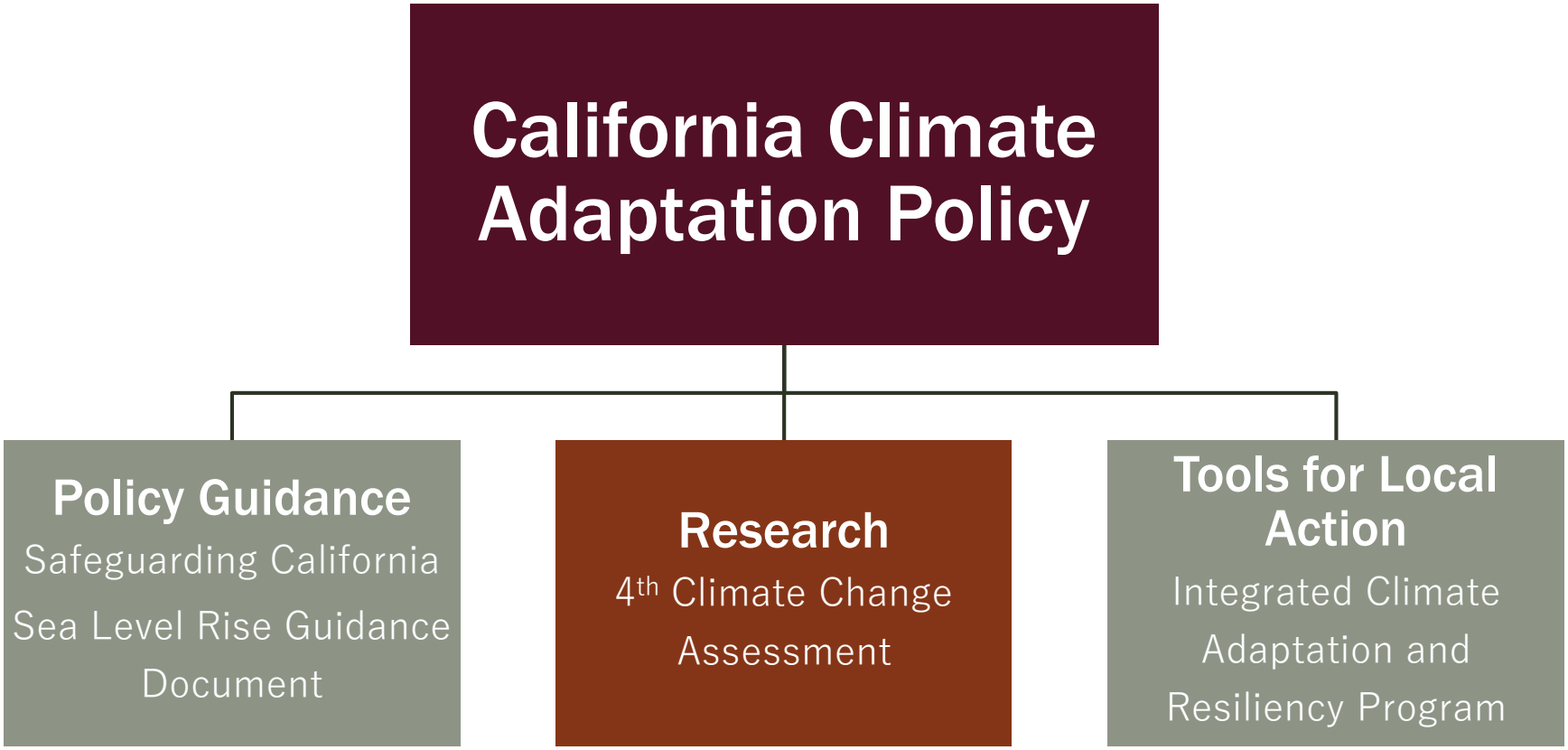
Research to support climate change policy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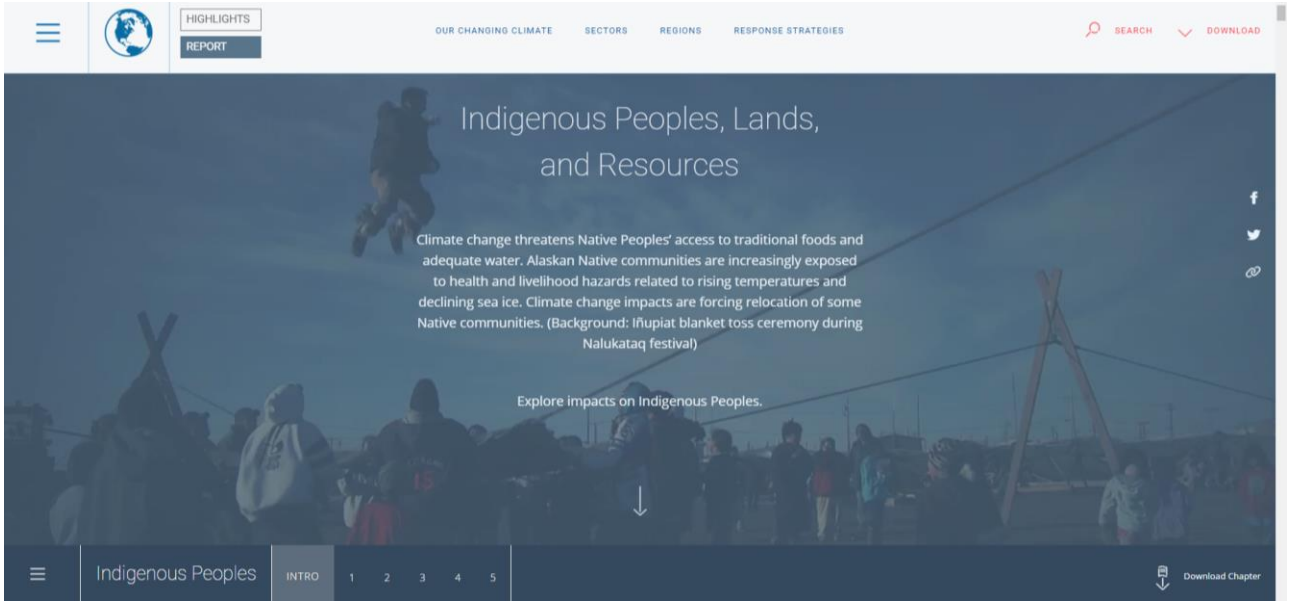
California's Fourth Climate Change Research Assessment

- Over 50 research projects in 3 portfolios
- Foundational scenarios and projections
- Regional and Tribal Assessments

16	**Natural Resources research projects** Wildfire & Forests, Habitat, Working Lands, Coast & Ocean, Water & Drought, Public Health
16	**Energy Sector research projects** Scenario Development, Probabilistic Forecasting, Extreme Events, Vulnerability & Resilience
18	**External Collaborator research projects** Ecology & Ecosystems, Urban Heat Island, Disadvantaged Communities

Statewide, Regional, and Tribal Assessments

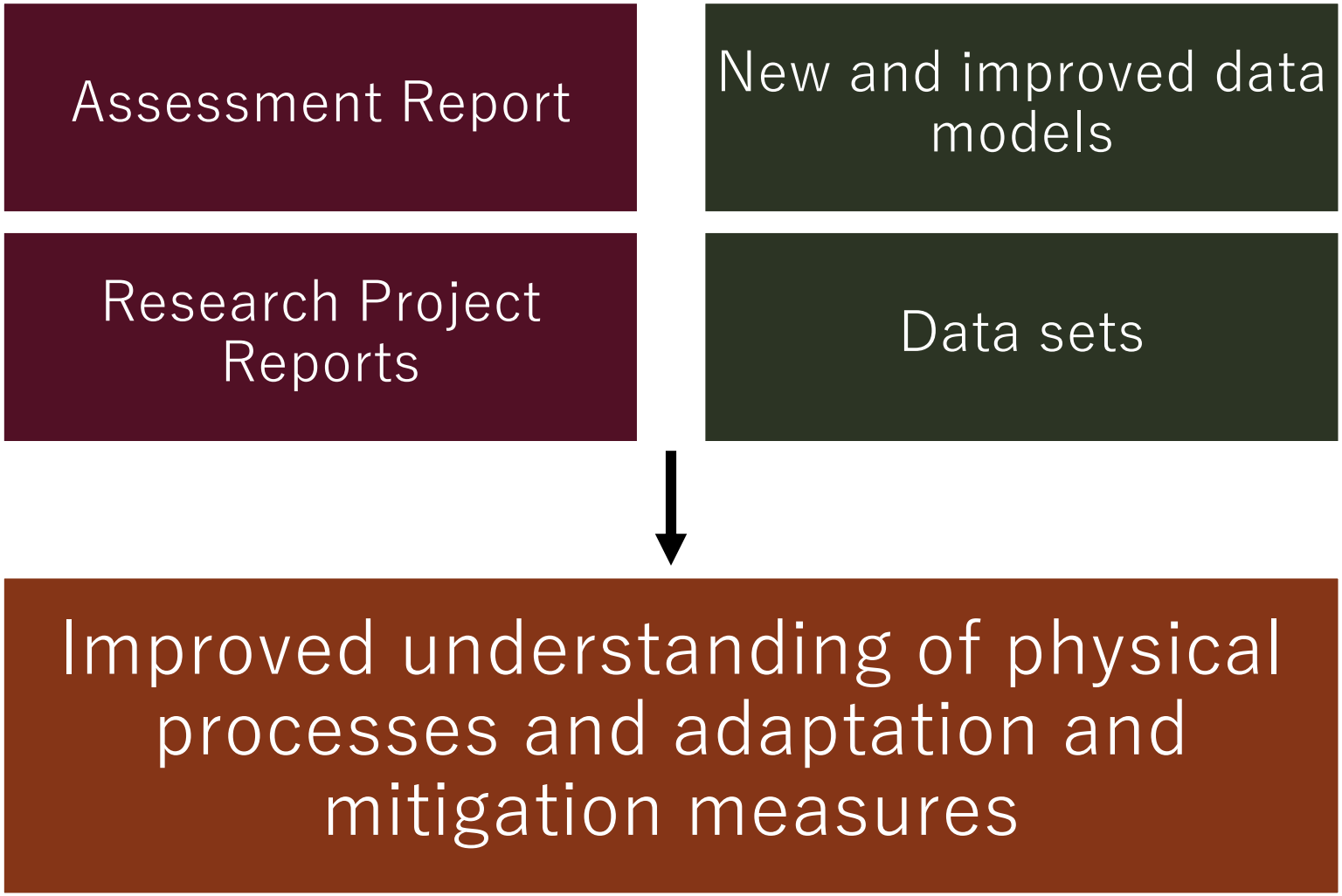
- Statewide, regional, and tribal assessments of climate impacts/ vulnerabilities will be drafted concurrently to individual project reports
- Tribal Assessment follows model of Indigenous Peoples, Land, and Resources Chapter of 2014 National Climate Assessment
- End goal to integrate tribal climate change issues in statewide and each of the regional reports



National Climate Change Assessment: Indigenous Peoples Chapter

http://nca2014.globalchange.gov/report/sectors/indigenous-peoples

Research Assessment Products



Climate Assessment Timeline

Milestone	Date
Research completed	December 2017
Draft Final reports	January 2018
Peer-review	Second quarter 2018
Public release	Fall 2018

Discussion: Tribal Support, Adaptation, and Partnerships